include any of a variety of detection algorithms for determining a two-dimensional location of the input object **22** relative to the light-diffusive screen **20**. As an example, the object detection algorithm device **56** can include a two-dimensional convolution filter, such as a Laplacian of Gaussian convolution filter, that applies a mathematical algorithm to each of the digitized images of the input object **22** to determine the location of one or more features of the input object **22**, such as fingertips, in two-dimensional space, as described in patent application Ser. No. 11/485,788. As another example, the object detection algorithm device **56** can generate a sequence of mid-points that are symmetrically disposed between edges along elongated portions of the input object **22** to form a skeletal representation of the input object **22**, as described in patent application Attorney Docket Number NG(MS)-018026USPRI. Accordingly, features associated with the input object **22** that can be determinative of input gestures can be detected in each of the silhouette images of the input object **22**.

[0029] The output data of the object detection algorithm device **56**, such as a convolution filtered image or a skeletal representation image, is provided to a calibration data and location resolver **58**. The calibration data and location resolver **58** determines a three-dimensional location of the features associated with the input object **22** at a given time. As an example, the calibration data and location resolver **58** can be configured to determine a parallax separation between end-points that are determined, for example, by a peak detector from convolution filtered images provided from each of the cameras **12** and **14**. As another example, the calibration data and location resolver **58** can be configured to compare the relative two-dimensional locations of the corresponding points in each of the skeletal representation images of the input object **22** and to interpolate a three-dimensional location of the points based on a parallax separation of the corresponding points. Accordingly, the calibration data and location resolver **58** can determine the three-dimensional location of the one or more features associated with the input object **22** relative to the light-diffusive screen **20** for each matched pair of images provided by the cameras **12** and **14**.

[0030] The data output from the calibration data and location resolver **58** is input to a gesture recognition device **60**. The gesture recognition device **60** interprets the three-dimensional location data associated with the one or more features of the input object and translates changes in the location data into an input gesture. For example, the gesture recognition device **60** could translate two-dimensional motion of the user's fingertip across the light-diffusive screen **20** as a gesture associated with mouse cursor movement. The gesture recognition device **60** could also translate a touch of the light-diffusive screen **20** as a gesture associated with a mouse left-button click. Because the gesture recognition device **60** implements the location data associated with the input object **22**, it can be programmed to recognize any of a variety of gestures that utilize one or more fingertips of the user's hand. In this way, the gesture recognition interface system **50** has a much more versatile input capability than touch sensitive screens.

[0031] For example, gestures that use multiple fingertips, or even fingertips from both hands, can be interpreted as input gestures that simulate zoom commands, rotate or "twist" commands, or even environment adjustments, such as volume and brightness control, all of which can be programmed for interpretation by the gesture recognition device **60**. The gesture recognition device **60** can also be programmed to recognize gestures from multiple users simultaneously. For example, the gesture recognition device **60** can provide multi-point control capability, such that coordinated actions between two hands and/or between multiple users can be implemented. Furthermore, the gesture recognition device **60** can work in conjunction with other computer input devices, such as a conventional mouse or keyboard, to provide additional types of gesture inputs. In addition, the simulated commands may not even require touching the light-diffusive screen **20**. For example, a user could simulate a mouse left-click by rapidly moving his or her finger in a downward then upward direction in the space above the light-diffusive screen **20**, such that the gesture recognition device **60** evaluates not only changes in the three-dimensional location of the fingertip, but also a time threshold associated with its motion. Moreover, any of a variety of input gestures could be formed from six-degree of freedom motion based on changes in three-dimensional location and orientation of the input object and any associated end-points.

[0032] The controller **24** could also include a predefined gesture memory **62** coupled to the gesture recognition device **60**. The predefined gesture memory **62** could include a plurality of predefined gestures, with each of the predefined gestures corresponding to a particular device input. For example, the predefined gesture memory **62** could include a database of specific arrangements and combinations of fingertip positions and motions that each correspond to a different computer input. The gesture recognition device **60**, upon receiving the three-dimensional location data associated with the one or more features of the input object over a given time, could poll the predefined gesture memory **62** to determine if the gesture input matches a predefined gesture. Upon determining a match, the gesture recognition device **60** could translate the gesture input into the device input that corresponds to the predefined gesture. The predefined gesture memory **62** could be pre-programmed with the appropriate predefined gesture inputs, or it could be dynamically programmable, such that new gestures can be added, along with the corresponding device inputs. For example, a user could activate a "begin gesture sample" operation, perform the new gesture, capture the appropriate images of the new gesture using the first camera **12** and the second camera **14**, and input the appropriate device input for which the new gesture corresponds.

[0033] It is to be understood that a given gesture recognition interface system is not intended to be limited by the example of FIG. **2**. Other implementations are possible for providing inputs in accordance with an aspect of the invention. For example, one or more of the devices in the controller **24** could be integral with other devices, or could be separate from the controller **24**. For example, the cameras **12** and **14** could each input their respective images to a common digitizer **52**. Accordingly, the gesture recognition interface system **50** can be configured in any of a variety of ways.

[0034] FIG. **3** illustrates another example of a gesture recognition interface system **100** in accordance with an aspect of the invention. Similar to the example of FIG. **1** described above, the gesture recognition interface system **100** includes a first camera **102** and a second camera **104** that may each include an IR filter, as well as a gesture table **106**. In the example of FIG. **3**, the gesture table **106** includes an IR light source **108** that illuminates an underside of a light-diffusive screen **110**. Accordingly, the cameras **102** and **104** are con-